



US005975892A

United States Patent [19]**Jones**[11] **Patent Number:** **5,975,892**[45] **Date of Patent:** **Nov. 2, 1999**

[54] **PNEUMATIC FLASH CALCINER
THERMALLY INSULATED IN FEED
STORAGE SILO**

[76] **Inventor:** Michael Andrew Jones, 3915 N.
Campbell Ave., #2-62, Tucson, Ariz.
85719

[21] **Appl. No.:** 09/199,908

[22] **Filed:** Nov. 25, 1998

[51] **Int. Cl.⁶** F27B 15/00

[52] **U.S. Cl.** 432/58; 432/106; 432/14

[58] **Field of Search** 432/58, 106, 14

[56] **References Cited**

U.S. PATENT DOCUMENTS

3,862,294	1/1975	Engelhart et al.	423/155
4,118,177	10/1978	Weber et al.	432/14
4,483,831	11/1984	Schmidt et al.	423/175
4,747,773	5/1988	Predescu et al.	432/14
4,932,862	6/1990	Kettenbauer	432/58
5,132,102	7/1992	Cohen et al.	423/23
5,174,749	12/1992	Jorgensen et al.	432/106
5,260,041	11/1993	Cohen et al.	423/175

Primary Examiner—Teresa Walberg

Assistant Examiner—Jiping Lu

Attorney, Agent, or Firm—Antonio R. Durando

[57] **ABSTRACT**

A self-contained calcination plant is enclosed in a feed-storage silo. The plant consists of a vertical reactor, a separation cyclone and a pair of heat exchangers connected by appropriate piping and immersed in the feed material stored in powdery form in the silo. A positive displacement blower creates an air stream that is preheated in one of the heat exchangers and fed in part to a gas burner and in part to a feed pipe at the bottom of the reactor. The feed material is kept in a fluidized state in the silo by air heated in the other heat exchanger and blown upward from the bottom of the storage compartment, from where the material is dropped into the feed pipe through rotary valves prior to injection into the reactor. The feed pipe is connected tangentially to the reactor so as to produce an upward swirling flow around the burner's flame. The fluidized reaction products are passed through a cyclone to separate the calcined oxides from the hot gases, which are then fed serially through the heat exchangers to preheat the process air used for the blower and the storage compartment. The solid product is recovered from the bottom of the cyclone. The entire plant is enclosed in the silo and, during operation, all units are immersed in the fluidized hot feed material that provides excellent heat transfer among all components and a sufficiently uniform temperature in the reactor to produce optimal calcination.

19 Claims, 3 Drawing Sheets

